WHAT IS CLAIMED IS:

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1. An optical device comprising:

an optical element having a container and first and second liquids contained sealingly in said container, said first and second liquids being substantially equal in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids differing from each other in transmittance, said first and second liquids making the boundary between said first and second liquids having a predetermined shape; and

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element.

2. An optical device comprising:

an optical element having a container and first and second liquids contained sealingly in said container, said first and second liquids being substantially equal in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids differing from each other in transmittance, said first and second liquids making the boundary between said first and second liquids having a predetermined shape;

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident

upon said optical element; and

a voltage application circuit for applying a voltage to said electrode,

wherein the shape of the boundary between said two liquids is changed by application of a voltage through said electrode to change the quantity of transmitted light in the bundle of rays passing through said optical element.

3. An optical device according to Claim 1, wherein said electrode comprises a first electrode and a second electrode insulated from said first liquid, said first electrode being formed so as to be in communication with said first liquid through a side portion of said container, said second electrode being formed in a side portion of said container.

4. An optical device according to Claim 1, wherein said electrode comprises a ring-shaped electrode formed so as to surround said second liquid.

5. An optical device according to Claim 2, wherein said electrode comprises a first electrode and a second electrode insulated from said first liquid, said first electrode being formed so as to be in communication with said first liquid through a side portion of said container, said second electrode being

formed in a side portion of said container.

6. An optical device according to Claim 2, wherein said electrode comprises a ring-shaped electrode formed so as to surround said second liquid.

7. An optical device according to Claim 1, wherein a side surface of said container has a plane inclined at a predetermined angle from the optical axis of the bundle of rays incident upon said optical element, and said first and second liquids are contained in said container in such a state that the boundary between said first and second liquids has a substantially flat shape.

8. An optical device according to Claim 7, wherein the thickness of said first liquid along the optical axis in a non-energized state is within the range of 0.1 to 0.5 mm.

9. An optical device according to Claim 7, wherein said electrode is provided along the side surface of said container inclined at the predetermined angle.

10. An optical device according to Claim 9, wherein said electrode comprises a ring-shaped

electrode formed so as to surround said second liquid.

11. An optical device according to Claim 1, wherein the optical path length of said first liquid along an optical axis and the optical path length of said second liquid along the optical axis change according to a voltage applied to said electrode.

12. An optical device according to Claim 1, wherein the optical transmittance of said first liquid per unit optical path length is lower than the optical transmittance of said second liquid per unit optical path length, and the optical path length of said first liquid along the optical axis increases in accordance with the distance from the optical axis.

13. An optical device according to Claim 1, wherein the optical transmittance of said first liquid per unit optical path length is lower than the optical transmittance of said second liquid per unit optical path length, and the optical path length of said first liquid along the optical axis changes between zero and a finite length according to a voltage applied to said electrode.

14. An optical device according to Claim 1, wherein the optical transmittance of said second liquid

per unit optical path length is lower than the optical transmittance of said first liquid per unit optical path length, and the optical path length of said second liquid along the optical axis decreases in accordance with the distance from the optical axis.

15. An optical device according to Claim 1, wherein an optical surface on one side corresponding to one of said liquids having a lower optical transmittance is formed as a curved surface.

16. An optical system in which an image is formed on an image formation plane through a lens element, said optical system comprising at least one of a diaphragm and a shutter incorporated in said lens element.

17. An optical system according to Claim 16, wherein said at least one of the diaphragm and the shutter is formed by an optical element having a container and first and second liquids contained sealingly in said container, said first and second liquids being substantially equal in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids differing from each other in transmittance, said first and second liquids making the boundary between said

first and second liquids having a predetermined shape, wherein an electrode is formed in said optical element in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element.

18. A photo-taking device comprising:

an imaging optical system for forming a subject image;

an optical element for changing the quantity of transmitted light in a bundle of rays passing through said imaging optical system;

image pick-up means for recording the subject image;

said optical element having a container and first and second liquids contained sealingly in said container, said first and second liquids being substantially equal in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids differing from each other in transmittance, said first and second liquids making the boundary between said first and second liquids having a predetermined shape;

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element; and

a voltage application circuit for applying a voltage to said electrode,

wherein the shape of the boundary between said two liquids is changed by application of a voltage through said electrode to change the quantity of transmitted light in the bundle of rays passing through said optical element.

19. An optical device comprising:

an optical element having a container having a side surface inclined at a predetermined angle from an optical axis, and first and second liquids contained sealingly in said container, said first and second liquids differing substantially from each other in transmittance, said first and second liquids existing without mixing with each other, said first and second liquids making the boundary between said first and second liquids having a rounded shape; and

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element.

20. An optical device comprising:

an optical element having a container having a side surface inclined at a predetermined angle from an optical axis, and first and second liquids contained sealingly in said container, said first and second liquids differing substantially from each other in transmittance, said first and second liquids existing

without mixing with each other, said first and second liquids making the boundary between said first and second liquids having a rounded shape;

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element; and

an application circuit for applying a voltage to said electrode,

wherein the shape of the boundary is changed by application of a voltage to change the refractive power with respect to light passing through said optical element.

21. An optical device according to Claim 19, wherein said electrode comprises a first electrode and a second electrode insulated from said first liquid, said first electrode being formed so as to be in communication with said first liquid through a side portion of said container, said second electrode being formed in a side portion of said container.

22. An optical device according to Claim 20, wherein said electrode comprises a first electrode and a second electrode insulated from said first liquid, said first electrode being formed so as to be in communication with said first liquid through a side portion of said container, said second electrode being

formed in a side portion of said container.

23. An optical device according to Claim 21, wherein said electrode comprises a ring-shaped electrode formed so as to surround said second liquid.

24. An optical device according to Claim 21, wherein said second electrode is provided along the side surface inclined at the predetermined angle.

25. An optical device according to Claim 19, wherein the optical path length of said first liquid along the optical axis and the optical path length of said second liquid along the optical axis change according to a voltage applied to said electrode.

26. An optical device according to Claim 19, wherein the refractive index of said first liquid is smaller than the refractive index of said second liquid, and the optical path length of said first liquid along the optical axis increases in accordance with the distance from the optical axis.

27. An optical device according to Claim 19, wherein the refractive index of said first liquid is smaller than the refractive index of said second liquid, and the optical path length of said first

liquid along the optical axis changes within the range of finite lengths according to a voltage applied to said electrode.

28. An optical device according to Claim 19, wherein an optical surface of said container containing said liquids is formed as a curved surface.

29. An optical system in which a predetermined image is formed or light of the image is converged by a lens element, said optical system comprising:

a variable-power element incorporated in the lens element,

30. An optical system according to Claim 29, wherein said variable-power element has a container having a side surface inclined at a predetermined angle from an optical axis, and first and second liquids contained sealingly in said container, said first and second liquids differing substantially from each other in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids making the boundary between said first and second liquids having a rounded shape, and

wherein an electrode is formed said variable-power element in such a place as to avoid interference with passage of a bundle of rays incident upon said

variable-power element.

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31. An optical system in which a predetermined image is formed or light of the image is converged by a lens element, said optical system comprising:

an optical element constituting a portion of said optical system, said optical element including a container having a side surface inclined at a predetermined angle from an optical axis, and first and second liquids contained sealingly in said container, said first and second liquids differing substantially from each other in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids making the boundary between said first and second liquids having a rounded shape; and

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element.

32. A photo-taking device comprising:

an imaging optical system for forming a subject image:

a variable-power optical element incorporated in said imaging optical system, said variable-power optical element including a container having a side surface inclined at a predetermined angle from an

optical axis, and first and second liquids contained sealingly in said container, said first and second liquids differing substantially from each other in refractive index, said first and second liquids existing without mixing with each other, said first and second liquids making the boundary between said first and second liquids having a rounded shape;

an electrode formed in such a place as to avoid interference with passage of a bundle of rays incident upon said optical element; and

image pick-up means for recording the subject image.